

WHAT IS CLAIMED IS:

1. A system for maintaining an IC-module near a set-point temperature while electrical power dissipation in said IC-module is varied; said system being comprised of:

5 a container having an open end with a seal for pressing against said IC-module;

at least one nozzle, in said container, for spraying a liquid coolant on said IC-module when said seal is pressed against said IC-module; and,

10 a pressure reducing means, coupled to said container, for producing a sub-atmospheric pressure between said container and said IC-module when said seal is pressed against said IC-module.

2. A system according to claim 1 wherein said pressure reducing means produces said sub-atmospheric pressure such that the boiling point of said liquid coolant is lowered by at least 10°C from its boiling point
5 at atmospheric pressure.

3. A system according to claim 2 wherein said pressure reducing means reduces said sub-atmospheric pressure to a point where essentially all of said liquid coolant from each nozzle rapidly vaporizes when it hits
5 said IC-module.

4. A system according to claim 2 which further includes a circulation subsystem, coupled to each nozzle, that holds said liquid coolant; and wherein said liquid coolant consists essentially of water.

5. A system according to claim 2 which includes multiple nozzles at spaced-apart locations in said container, and each nozzle ejects just a single droplet of said liquid coolant when it receives one control
5 signal.

6. A system according to claim 5 which further includes a closed-loop control means for: a) receiving a sensor signal representing a sensed temperature of said IC-module, and b) sending said control signal to all of
5 said nozzles simultaneously with a frequency that increases as the difference between said sensed temperature and said set-point increases.

7. A system according to claim 5 which further includes a closed-loop control means for: a) receiving a sensor signal representing a sensed temperature of said IC-module, b) sending said control signal to a subset of
5 said nozzles simultaneously, and c) increasing the number of nozzles in said subset as the difference between said sensed temperature and said set-point increase.

8. A system according to claim 5 wherein each nozzle ejects each droplet by squeezing said coolant with a piezoelectric device.

9. A system according to claim 5 wherein each nozzle ejects each droplet by heating said coolant with an electric heater.

10. A system according to claim 2 wherein each nozzle includes a means for spraying multiple droplets of said liquid coolant when it receives one control signal.

11. A system according to claim 10 which further includes a closed-loop control means for: a) receiving a sensor signal representing a sensed temperature of said IC-module, and b) sending said control signal with an ON-OFF ratio that increases as the difference between said sensed temperature and said set-point increases.

12. A system according to claim 2 wherein said seal is shaped to encircle a surface on said IC-module which encloses an IC-chip.

13. A system according to claim 2 wherein said seal is shaped to encircle an exposed surface on an IC-chip in said IC-module.